AS–1484

B.Sc. (Part—III) Semester—VI Examination

STATISTICS

Time : Three Hours] [Maximum Marks : 80

Note :— ALL questions are compulsory and carry marks as indicated.

1. (A) Fill in the blanks : 2

(i) The _____ divides a set of feasible solutions into subsets.

(ii) An assignment problem can be viewed as a special case of transportation problem in which the capacity from each source is _____ and the demand at each destination is _____.

(iii) The efficient alternative to multiple t-test is _____.

(iv) A substance or a factor attach to an experimental unit to know its effect is termed as _____.

(B) Choose the correct alternative from the following : 2

(i) _____ is the process of coming as close as possible the objectives.

(a) Linear programming (b) Satisfying

(c) Optimizing (d) Maximizing

(ii) Randomization is a process in which the treatments are allocated to the experimental units :

(a) At the will of the investigator (b) In sequence

(c) With equal probability (d) None of above

(iii) Completely randomized designs are mostly used in _____

(a) Field experiments (b) Experiments on animals

(c) Pot experiments (d) All the above

(iv) In one way classification with more than two treatments, the equality of treatment means is tested by :

(a) t test

(b) χ^2 test

(c) F test

(d) None of the above

(C) Answer in **one** sentence :

(i) What are constraints in LPP ?

(ii) Which transportation method gives best initial basic feasible solution ? 4

(iii) What is ideal time in sequencing problem ?

(iv) Which design is used to control two way variability ?

2. (A) Define :

(i) Basic feasible solution

(ii) Objective function of LPP.

(B) Explain simplex method of solving linear programming problem. 4

(C) Define Linear programming problem. 4

OR

3. (P) Define primal and dual problem of LPP. 4

(Q) Explain the limitation of linear programming. 4

(R) Solve the following LPP by graphical method : 4

Max. $Z = 2x_1 + 4x_2$

subject to

$x_1 + 2x_2 \leq 5$

$x_1 + x_2 \leq 4$

and $x_1, x_2 \geq 0$.

4. (A) Define transportation problem; state and prove a necessary and sufficient condition for the existence of a feasible solution to transportation problem. 6

(B) Explain the least cost method of finding initial basic feasible solution to the transportation problem and solve the following transportation problem by using this method :

	W_1	W_2	W_3	W_4	Supply
F_1	10	0	20	11	20
F_2	12	7	9	20	25
F_3	0	14	16	18	15
Demand	10	15	15	20	

6

OR

5. (P) Define feasible solution, basic solution and non-degenerate solution in a transportation problem. 6

(Q) Explain Vogel's approximation method of finding initial basic feasible solution to the transportation problem and solve the following transportation problem by using this method : 6

	D_1	D_2	D_3	D_4	
O_1	11	13	17	14	250
O_2	16	18	14	10	300
O_3	21	24	13	10	400
	200	225	275	250	

6. (A) Define :

(i) Saddle point

(ii) Value of game. 4

(B) Explain assignment problem with suitable example. 4

(C) Explain the procedure of finding optimal sequence for sequencing problem of n jobs on two machines. 4

OR

7. (P) Define :

(i) Total elapsed time

(ii) Optimal sequence. 4

(Q) A computer centre has three programmers. The centre incharge want three application programmes to be developed following table gives hours required to developed programme A, B, C by the programmers 1, 2 and 3 respectively :

Programmes

Programmer	A	B	C
1	120	100	80
2	80	90	110
3	110	140	120

Assign the programmers to the programmes in such way that the total time required is minimum. 4

(R) Explain maximin minimax principle of the game. 4

8. (A) Define analysis of variance technique with assumptions. 4

(B) Explain one way classification ANOVA with assumptions. 4

(C) Explain the various steps for two way classification with one observation per cell. 4

OR

(Contd.)

9. (P) Explain the analysis of variance technique and its application. 4

(Q) Derive the various sum of square for one way classification. 4

(R) Write mathematical model and ANOVA table for two way classification with observation per cell. 4

10. (A) Define :

(i) Experiment

(ii) Treatment. 4

(B) Explain the purpose of design of experiment and characteristics of a good experimental design. 4

(C) Explain CRD with its advantages and disadvantages. 4

OR

11. (P) What are the principles of design of experiment and explain any one. 4

(Q) Explain various sum of squares in CRD. 4

(R) Explain the efficiency of RBD relative to CRD. 4

12. (A) Explain latin square design and state under what conditions can this design be used ? 6

(B) Explain what is meant by main effects and interactions in factorial experiment. State the advantages of factorial experiment over a simple experiment. 6

OR

13. (P) Give the mathematical model and assumptions of LSD and explain the analysis of variance table of LSD. 6

(Q) What is treatment contrast ? When are two such contrast said to be orthogonal ? State the advantages of factorial experiment. 6